

ATTACHMENT A
The Beginnings of a US Navy Torpedo Warfare Capability
STILETTO, CUSHING and a Few Torpedoes ¹

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<i>Building the Mosquito Fleet: U.S. Navy's First Torpedo Boats (2001)</i>
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<i>Goat Island and the U.S. Naval Torpedo Station (2016)</i>
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Introduction

One of the most active periods of experimentation at the Newport Torpedo Station, was from 1890 to 1897, when the U.S. Navy's only two torpedo boats, STILETTO and CUSHING were testing the first automobile torpedoes and developing tactics for their employment. Torpedo boats were part of the Atlantic and Gulf coasts harbor defense capability proposed in response to studies conducted by the Naval War College.² Congress authorized CUSHING (TB-1) in 1886 and the purchase of STILETTO in 1887, but without a workable automobile (self-propelled) torpedo, more boats were a hard sell. As the Secretary of the Navy reported in 1890:

"This country has been thus far absolutely without a successful automobile torpedo...Vague hopes and expectations that something will turn up gradually fixed themselves upon the Howell torpedo as the probable solution of the problem, although it was still in experimental stage."

The following year responsibility for all torpedo development was placed under the charge of a Torpedo Board headed by George Converse.

The Torpedoes

Several designs were considered and tested by the Navy through 1894 including a rocket torpedo and an electric torpedo. Only two were selected for full development, qualification testing and production.

Howell Torpedo

- **Description-** The propeller-driven Howell torpedo, first patented in 1871, was powered by a heavy flywheel spun up by a shipboard auxiliary steam turbine prior to launch. By 1888 prototypes had demonstrated a range of 600 yards, achieving 24 knots over the first 200 yards and good directional stability provided by the gyroscopic action of the flywheel. Advantages over the Whitehead torpedo were a wakeless trajectory, lighter weight, and greater explosive charge. Its principal disadvantage was that the flywheel had to be kept at full speed when an enemy was encountered, and this time was limited by oil supply to only 30 minutes.³
- **Production-** In January 1889 the Navy placed a production order with the Hotchkiss Ordnance Co. of Providence for 30 Howell torpedoes, with 10 to be delivered by July 1890. Production delays, torpedo losses in preliminary trials and redesigns required by

early failures mounted. By 1893 only 7 had been presented for official trial. In the following year 21 were ready for the official trials, with only 2 accepted. Eventually 50 were delivered before the decision was made in 1897 to produce only the Whitehead torpedo.

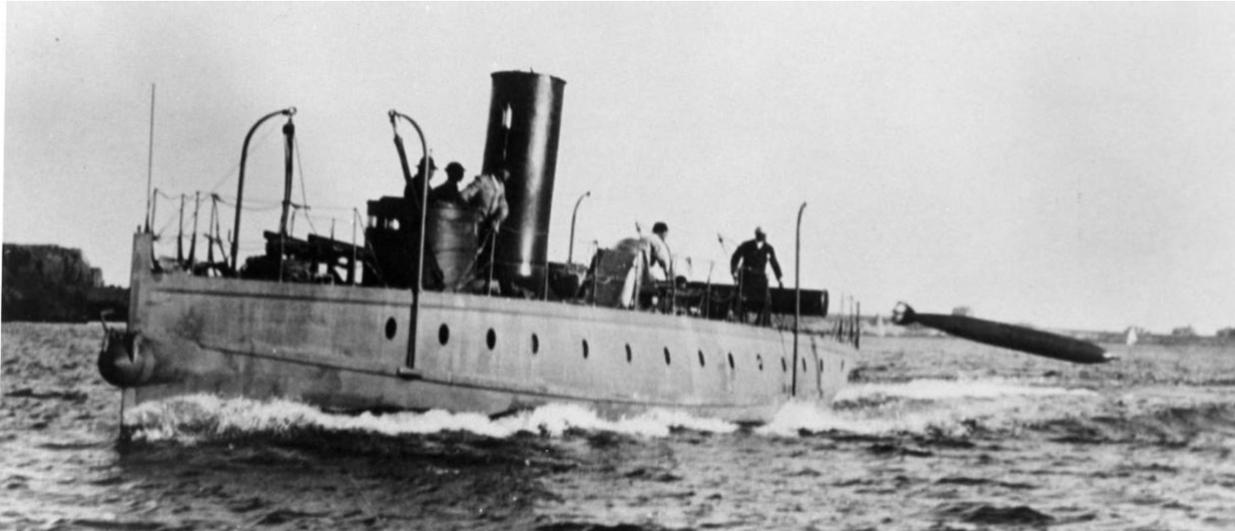


Figure A1- STILETTO with bow torpedo tube and trainable tube centerline aft testing the Howell torpedo on the Tiverton range. Source U.S. Navy photo.

- **Trials-** All Hotchkiss preliminary trials and the official Navy acceptance trials were conducted by STILETTO, fitted in 1892 with two launch tubes, (one bow and one turntable on deck aft) on a company test range in Tiverton north of the railway bridge. Trials tested the torpedo, launching apparatus and handling equipment. STILETTO was in constant use in 1892 conducting tests perfecting the Howell torpedo. Torpedo Board acceptance trials began July 15, 1893, and continued as torpedoes came available. Each torpedo was tested for speed and accuracy for a range of 400 yards when launched from STILETTO steaming at 18 knots. Special noise tests were run in 1895 to determine whether the noise of the auxiliary turbine and spinning flywheel could be detected before that of STILETTO's underway noise; it could not. No tests were run in the winter when STILETTO was usually hauled at the Station for maintenance.

Whitehead Torpedo⁴

- **Acquisition-** Concerned with delays in the production of the Howell torpedo the Navy arranged with the Whitehead Torpedo Company of Fiume Austria for an American company to manufacture the torpedo under license and agreed to a royalty on each torpedo for 15 years. In 1891 the E. W. Bliss Company of Brooklyn, NY obtained a patent, plans, and working models of the torpedo and launching apparatus as well as a Navy order for 100 torpedoes, with deliveries to start November 1891 at the rate of 10 per month.
- **Description-** The propeller of the Whitehead torpedo was driven by a reciprocating engine powered by a compressed air flask. An air compressor was placed onboard the

launching vessel to charge the flask. Heavier, larger and more costly than the Howell it had become the standard torpedo throughout Europe. Initial models achieved 23 knots over a range of 600 yards. ⁵

- **Production-** Bliss experienced delays in obtaining a suitable forged air flask. By October 1893 the Navy had accepted 28 torpedoes and the following year the remainder of the 100 were accepted. The Navy placed follow orders for models of different lengths and diameters, increased explosive weight, a turbine rather than reciprocating engine and improved accuracy.



Figure A2 CUSHING (TB-1) in final torpedo tube configuration; bow tube removed, trainable tubes port and starboard amidships Source US Navy photo

- **Trials-** Bliss established a test facility in Noyack Bay on the eastern end of Long Island. CUSHING's experiments with the Whitehead torpedo began September 1892 and Navy acceptance trials the following May. CUSHING conducted both preliminary and acceptance trials. In July 1892 CUSHING was fitted with a bow tube and twin tubes on centerline aft, mounted on a common turntable. The latter was later changed to port and starboard single trainable tubes; this became the standard for following boats. For acceptance each torpedo had to meet the accuracy and speed specification in three out of five consecutive runs. Bliss received a relaxation of accuracy for the first 10 torpedoes; the subsequent 90 met the following specification:
 - Accuracy- A deviation of not more than 8 yards right or left at 400 yards, and 24 yards at 800 yards. Limit from set depth not to exceed 15 inches at both ranges.
 - Speed- Mean speed of three runs of 800 yards to be at least 26.5 knots; one additional 400 yard run to be at least 30 knots.

CUSHING remained heavily involved in torpedo acceptance trials through 1896. Each winter CUSHING was usually hauled for maintenance at the Washington Navy Yard.

Torpedo Boat Operations and Tactics

Night Maneuvers- Best condition for a torpedo boat attack was at night and experiments were run to determine the best color and tactics for success. STILETTO and CUSHING were originally painted a dark olive green like that used abroad; then CUSHING was lightened from time to time for comparison. Returning to Newport at night from Noyack Bay CUSHING often ran simulated attacks while attempting to avoid being spotted by searchlights on Fort Adams, warships at anchor and the Torpedo Station. In 1893 experiments CUSHING was able to get within torpedo range of an alerted cruiser and even to its own mooring without detection. Conclusions drawn from these experiments were incorporated into doctrine and the curriculum of the Torpedo School.

Developing a Torpedo Boat Cadre- George Converse and other members of the Torpedo Board instructed at the Naval War College and the Torpedo School. Officer students boarded STILETTO and CUSHING to witness and conduct torpedo runs under service conditions. Lieut. Cameron McR Winslow, CUSHING's first commanding officer, had been in advanced studies at the Torpedo Station for 2 1/2 years prior to taking command. He and those to follow were highly rated; four of the first five CUSHING CO's made Admiral.

Improving Torpedo Accuracy- Hand held devices such as a torpedo director were developed and tested to aid aiming the torpedo tubes prior to launch.

Assessing Foreign Torpedo Handling & Launching Capabilities- CUSHING and members of the Torpedo Board participated in the April 1893 International Naval Rendezvous and Review, starting at Hampton Roads, and sailing as a 35-ship fleet to New York, to assess the torpedo launching and handling capabilities of the foreign warships.⁶

Pathfinding Torpedo Boat Transit the Length of the Atlantic Coast- In spring 1895 CUSHING transited from Wash. DC to Jacksonville FL, "*through the rivers and canals*", exploring a route later used by the First Torpedo Boat Flotilla deploying to Key West FL in advance of the Spanish-American War.

Results

By mid-1897 (when George Converse detached from Newport) the basics for a competent modern torpedo force had been established.⁷ Scores of officers trained, doctrine developed, torpedo systems proven in hundreds of torpedo launchings, nearly 350 torpedoes accepted and in inventory. The Navy was ready to employ 19 new, Congressionally authorized torpedo boats; 3 delivered and 16 building.⁸ It had all been done by a small group of officers in Newport aided by two reliable Herreshoff designed and built torpedo boats.

¹ Primary sources are the Annual Reports of the Secretary of the Navy, 1890-97. Included within the annual compilation, are reports to the Secretary from each Bureau, and lesser commands including US Naval Torpedo Station Newport, the Torpedo Board, and Newport's Naval War College and Torpedo School.

² British naval maneuvers in 1893 demonstrated that torpedo boats defending a port against cruisers and battleships extracted losses upon the attacker of 6 times in men and 4 times in cost of vessel damage.

³ Thomas Wildenberg & Norman Polmar, *Ship Killer: A History of the American Torpedo*. Naval Institute Press, Annapolis, MD. 2010. Pages 20-23.

⁴ See also W. J. Sears, Lieut. USN “A General Description of the Whitehead Torpedo”, *US Naval Institute Proceedings*, Vol. 24, Jan. 1898.

⁵*Ship Killer*, pages 19-31.

⁶ All navies including the US, were fitting battleships, cruisers and gunboats, as well as torpedo boats, to launch torpedoes.

⁷ In the 1896 Annual Report Secretary of the Navy Herbert cited Converse for his “remarkable knowledge of his specialty and business capacity.” He was the only officer meritoriously cited in the report.

⁸ Herreshoff built 5 of the 19, the most of any builder.